



Comprehensive Bicycle Plan

City of New Bern, NC



gutter pan or by raising the drainage grates and paving all the way to the curb.

Bicycle facilities, including trails, require an additional level of effort to provide acceptable maintenance. Maintenance issues occur most frequently on the right side of the pavement, where the cyclist is likely to be riding. Consequently, a more frequent maintenance cycle to address these defects should be provided for bicycle routes. Areas such as bridges where excessive debris tends to build up and bicyclists have limited refuge options should be maintained even more frequently. Examples of this include the US 17-Neuse River Bridge and the Trent River Bridge.

Signal Clearance

Traffic signal timing and loops along bicycle facilities require extra attention. According to the *MUTCD*²⁰,

“At installations where visibility-limited signal faces are used, signal faces shall be adjusted so bicyclists for whom the indications are intended can see the signal indications. If the visibility-limited signal faces cannot be aimed to serve the bicyclist, then separate signal faces shall be provided for the bicyclist.

On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of bicyclists.”

While the former can be easily evaluated, the latter concern (that of signal timing) is a little harder to address. The *AASHTO Guide for the Development of Bicycle Facilities*²¹

provides information of clearance intervals and minimum green times for bicyclists. At wide intersections, the clearance interval equation can result in some excessively long yellow-plus-all red periods for signals. If the facility consists of a multi-use path or a bike lane, a signal loop can be placed in the bike lane or on the path in advance of the intersection. When a cyclist passes over the loop, the signal will extend the green time for the intersection approach to accommodate the crossing cyclists. This treatment is in common use for motorists and has been applied in various locations for bikes. The design of the loop is critical; an oversized loop in a bike lane will detect cars in the adjacent lane. An effective loop design for detecting bikes in bike lanes is a quadrapole 2 feet wide and 20 feet long (approximately half the size of a normal 40 foot roadway loop). Such a loop readily detects cyclists, but will not detect a car six inches to the side.

Roadway Symbol Buildup

Thermoplastic buildup is another concern of bicyclists. Bike lane symbols, lane use (directional) symbols, even crosswalks can all build up with repeated application and cause handling problems for bicyclists. More than two layers of thermoplastic (one marking) should not be allowed on bicycle facilities.

The slipperiness of thermoplastic and paints is another concern of bicyclists. One way to mitigate this concern is to add sharp silica sand to the glass spheres that make up the wet thermoplastic or paint. This increases the roughness of the markings' surface, reducing the potential for bicyclists to slip on the thermoplastic.

²⁰ FHWA, *Manual on Uniform Traffic Control Devices*, pg. 9D-1, Washington, DC, 2003.

²¹ *AASHTO Guide for the Development of Bicycle Facilities*, pg. 65, American Association of State

Highway and Transportation Officials, Washington, DC, 1999.





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Safety Railings along Bicycle Facilities

Bridge railing heights have been the subject of recent revisions to the *AASHTO Guide for the Development of Bicycle Facilities* and ongoing debates among bicycle facility design professionals. The current *AASHTO Guide for the Development of Bicycle Facilities* states that railing heights should be at least 42 inches to prevent bicyclists who hit the railing from tipping over the top. However, the current AASHTO Bridge Specifications require a 54-inch railing (this is also referenced in NCDOT's Bridge Policy as found at the following link:

<http://www.ncdot.org/doh/construction/altern/value/manuals/RDM2001/revpt1ch6-1yel.pdf>). In practice, designers have been using the 54-inch railing when a structure is being built to the AASHTO specifications and a 42-inch railing along non-structural locations, such as when protecting bicyclists from embankments.

Bicycle Parking Facilities

Just as motorists need a place to park their cars when they arrive at destinations, bicyclists also need a place to park their bicycles. Consequently, when creating a transportation system to accommodate bicycling, parking must be included in that system. Bicycle parking is critical in areas where there are frequent bicycle riders such as the mall, schools, the YMCA, the marina, and other recreational areas. Bicycle parking should also be considered downtown and near businesses where bicyclists may frequent.



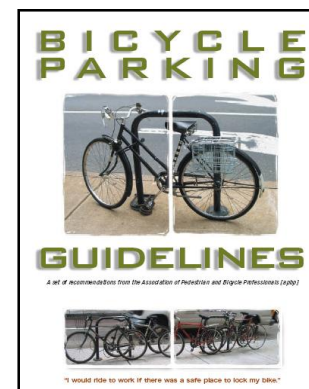
Typically, when parking is installed for bicyclists, the primary consideration is simply the accessibility or the convenience of the parking. While these are significant concerns for bicyclists, they are not the only issues. Bicyclists must also consider the security of the parking and the protection afforded to the bicycle.

The security concerns of bicycle parking can be addressed in several ways. High visibility of the parking rack can improve security. By locating parking near storefronts, or in high pedestrian use zones, the potential for theft or vandalism is reduced. However, placement needs to be carefully considered so as not to become a hazard to pedestrians or to diminish ADA accessibility. Well-lit areas can improve the security in areas where bicycles are parked after dark. Providing racks that support the frame instead of the wheel make it easier to lock a bike without damaging it. Bike lockers also provide good security for bicycles.

The protection required for a bicycle varies with respect to the purpose of the bicycle trip. For short duration trips, such as to the grocery store or the library, U-shaped bicycle

racks on a concrete pad in front of the building may be acceptable. At a park and ride lot, or in front of an office building where the parking is for commuters, bike lockers or covered parking is more appropriate.

The Association of Pedestrian and Bicycle Professionals has produced a guidance document on good bicycle parking design.



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This excellent document is available on line at the APBP website.²² The website <http://www.bicyclinginfo.org/de/park.cfm> also provides information regarding bicycle parking costs and number of spaces recommended.

There are four basic elements to bicycle rack design. First, the bicycle should be supported upright by its frame in at least two places. Second, the rack should enable the frame and one wheel to be locked. Third, the rack should be anchored so that it cannot be stolen with bikes on it. Fourth, the rack should be placed as close to the building it serves as possible.

Bicycle racks can be tailored to reflect the culture or character of an area, or as a form of public art. Bike racks such as the one shown to the right make a statement about the area in which they serve as well as providing parking facilities for bicyclists.



Safety Initiatives to Reduce Bicycle Motor Vehicle Crashes in New Bern

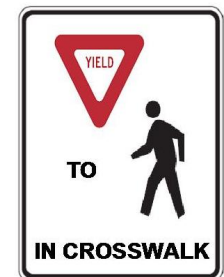
Due to the low number of bicycle crashes reported for New Bern, these crashes were not analyzed in this study. However, the next step for further study could include an analysis of the bicycle crashes in the area with mitigation measures provided at each problem site.

Engineering/Traffic Calming Countermeasures

Intersection Signage

Static signs such as *NO TURN ON RED when Pedestrians Present* or the *Left Turning Vehicles Yield to Pedestrians* have been found to reduce the incidence of pedestrian conflicts at intersections.

Consequently, it is reasonable to expect that these signs would also reduce the conflicts between motorists and bicyclists riding on a sidepath. However, they should be used sparingly and only where a problem has been documented and relatively constant pedestrian/bicycle use of the intersection exists. The overuse of signs or the use of the signs where pedestrians or bicyclists are not using the crosswalks dilute the ability of the signs to command the attention of motorists. Eventually this results in the signs being just background visual clutter.



Because they are real time traffic control devices, blank out signs like the one pictured below can continue to be effective at intersections because they are only activated when there is a potential conflict. If motorists see a YIELD TO PEDS sign next to a permissive left turn signal, the motorists will know a pedestrian is crossing the conflicting crosswalk at that time. This “real-time” aspect of blank out signs allows for them to be placed at locations where conflicts are not



²² APBP, Bicycle Parking, available at <http://www.bicyclinginfo.org/pdf/bikepark.pdf>.



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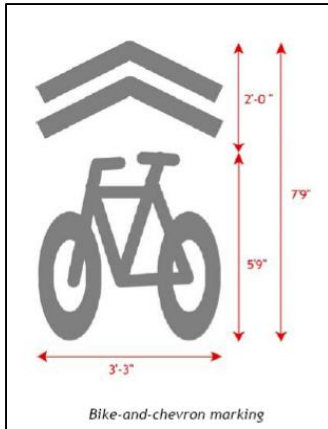
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frequent or constant enough to make a static sign appropriate.

Shared Lane Symbol

The Shared Lane Symbol, or “Sharrow”, has the potential to reduce several different types of crashes and is being used in jurisdictions across the country. Because cyclists tend to center over the symbol, it may be useful for reducing door crashes (where a parked motorist opens a door into the path of a cyclist).



Additionally, a similar treatment has been found to reduce wrong way riding and riding on the sidewalk, and to improve bicyclists' position in the travel lanes.

Consequently this treatment may actually reduce the incidence of “motorist failure to yield to the bicyclist crashes” and “overtaking crashes”. Despite the potential for these collateral improvements, this treatment is recommended only in very selective areas, such as adjacent to on-street parking, or completing a link in a bicycle route.

This treatment is experimental and has not been approved by MUTCD, so its use would require one of two alternatives. This treatment can be used as a demonstration project on a non-state maintained roadway. If there is a desire to use Sharrows on a state or federal roadway, a Request to Experiment must be filed with FHWA prior to implementation. An evaluation plan must accompany this Request to Experiment and this must include measures of effectiveness. The following measures of effectiveness are suggested for New Bern:



- Separation between parked cars and bicyclists
- Percent of bicyclists riding on the sidewalk
- Percent of bicyclists riding against traffic
- Motorists' understanding of the symbol
- Bicyclists' understanding of the symbol

Transit Interface

At this time, no bicycle amenities are included on the vans, mini-buses, and sedans that make up the fleet of the Craven Area Rural Transit System (CARTS). CARTS, a service administered by Craven County, is geared toward elderly and handicapped riders with the service available to the general public on a space-available basis. Bike racks on these vehicles can eliminate a barrier presented to those individuals who need their bicycle for supplemental transportation after they deboard. Amenities for bikes on the CARTS service should be considered as a way to enhance the multimodal riding experience for users by extending the catchment area for the transit service, giving bicyclists more options, and

potentially increasing transit ridership. Another amenity that should be considered to more fully integrate bicycle use and the transit system is the installation of bike racks near heavily used bus stops and destination points in town. With features such as bike racks, benches, and shelters, bus stops become more user-friendly environments and can attract additional riders.



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Public Amenities

In addition to bicycle parking and provisions for bikes on buses, other amenities should be considered for implementation in order to create a more user-friendly bicycle system. Benches, water fountains, public restrooms, and changing areas provide riders with valuable services. These amenities are especially helpful in high traffic areas such as downtown and by major destination points such as shopping areas and schools. Bicycle rentals, especially within the downtown and near the marina, can also be a great amenity for tourists and residents alike. This service could be provided through a private entity or administered by the parks and recreation department.

